

COMMUNICATIONS AND MEASUREMENT APPARATUS

Background of the Invention

The present invention is directed to a communications and measurement apparatus with a cuboid housing, and, in particular, to a communications and measurement apparatus having a display unit on its front face and a plurality of openings arranged side-by-side for receiving plug-in modules on its back face. At least one of these modules is a data processing module. The apparatus of the present invention is further equipped with additional modules for forming external interfaces for measurement and data transmission lines.

In a publication of GN Navtel, entitled "interWATCH 95000" (dated September 1994), three openings are provided on a rear face of a communications and measurement apparatus disclosed therein; one opening is intended for receiving a data processing module, while another opening is intended for a module for establishing connection with a Local Area Network. A third opening on the rear face of the known apparatus is provided to receive parallel or serial devices and/or the connection for a VGA monitor. The apparatus of "interWATCH 95000" has additional modules on the top of the housing where eight openings are provided for receiving eight modules. These modules are designed for forming external interfaces for measurement and data

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transmission lines.

Summary of the Invention

5 An object of the invention is to provide an easy-to-handle communication apparatus having a compact design. In order to achieve this object, in a communication and measurement apparatus of the aforementioned type, all the additional modules are arranged in the same number of openings on the rear face of the apparatus next to the data processing module on one side of this module, and an extra module having a system control is arranged between the additional modules and the data processing module so that its component-carrying side faces said data processing module. In accordance with the present invention, all of the additional modules and the extra module have a common backplane.

10 One advantage of the apparatus according to the present invention is the fact that by arranging all the modules on the rear face, the apparatus can be mounted in racks, in which case the apparatus can be accessed from the front and the rear, although it is not accessible from above. The apparatus of the present invention takes this feature into account by having its top closed and having all the additional modules on its rear face. The apparatus according to the present invention can therefore be stacked with other apparatus. Another advantage of the apparatus of the present invention is that it has a compact design due to the side-by-side arrangement of the modules. This side-by-side arrangement allows for good ventilation because in the apparatus of the present invention an internal (relatively large-surface) backplane of the additional modules and of the extra module runs vertically in the apparatus. As a result, air convection is not hindered. The special arrangement of the extra module also contributes to the compact design, since it obviates the necessity of running the electrical conductor leading to the data processing module around the extra module or the backplane.

20 In the apparatus according to the present invention, the extra module is advantageously connected to the backplane of the data processing module through a plug-and-socket connection arranged on its component-carrying side and a short conductor segment. Thus, a particularly simple electric connection can be established

between the extra module and the backplane of the data processing module.

A fan device is advantageously arranged under the modules of the apparatus according to the present invention. Thus, the natural convection is reinforced by forced ventilation, which is particularly effective in the apparatus according to the invention because the relatively large backplane of the additional modules and of the extra module does not impair the air circulation.

Brief Description of the Drawings

For a more complete understanding of this invention, reference should be made to the embodiments illustrated in the accompanying drawings and described below.

In the drawings:

Figure 1 shows a perspective view of one embodiment of the apparatus according to the invention observed obliquely from the front;

Figure 2 shows a perspective view of the same embodiment observed obliquely from behind;

Figure 3 shows a view identical to that of Figure 2, but omitting some of the additional modules; and

Figure 4 shows a perspective view of the same embodiment with the housing removed.

Detailed Description

As Figure 1 shows, apparatus 1 comprises a cuboid housing 2, which includes a display unit 4 with an LCD display 5 on front face 3. Display unit 4 hinges on its upper edge 6 and, when opened on this hinge, exposes a cover plate 3A on front face 3. In addition, an opening 7 for receiving a diskette is provided on front face 3. Each side of housing 2 is provided with a carrying handle; Figure 1 shows one of these, namely carrying handle 8.

Figures 2 and 3 show that a plurality of plug-in modules 11 are provided on a back-plate 10 in the top right area of Figure 2. Modules 11 are introduced in openings (not shown) provided in the rear wall of housing 2. These plug-in modules 11 form a data processing module 11A, and they may comprise

commercially available PC modules. In back-plate 10, below plug-in modules 11, another opening is provided, in which a mass storage device 12 is mounted.

Figures 2 and 3 further show that additional openings 13 are provided on back-plate 10 of apparatus 1, where additional modules 14 through 19 can be mounted. The additional modules 14 through 19 are modules forming external interfaces for measurement and data transmission lines. Figure 3 only shows one additional module 14, in order to make internal backplane 20 visible.

Backplane 20 has plugs (not illustrated) on its side facing the front. These plugs are freely accessible when cover plate 3A is removed, and they allow additional functions to be implemented using additional plugged-on boards.

Figures 2 and 3 also show that an extra module 21, referred to as a system control module, is mounted in the rightmost of openings 13. This extra module 21 is advantageously provided with a system control processor. The extra module 21 is arranged close to data processing modules 11A to achieve electric connection between extra module 21 and data processing module 11A without complicating the design or requiring additional space.

Figure 4 shows extra module 21 again, which in the embodiment illustrated is provided with a circuit board 22. Components, not illustrated in Figure 4 for the sake of clarity, are located on the side facing the observer of said circuit board 22. A plug device 23 is also located here, from which a flexible conductor 24 runs as a short conductor segment on a backplane 25 running horizontally under the additional data processing module 11A. Thus, an electric connection is established between extra module 21 and data processing module 11A without requiring a conductor to run over, under, or behind the extra module. The arrangement of the extra module 21 contributes substantially to the compact design of the apparatus according to the invention.

It should also be pointed out that, in the embodiment illustrated, two fans 26 and 27 are located under the modules, from which air moves after filtering between modules 14 through 19 and 21, thus providing a good cooling effect.

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